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Report of the first session

IPFC/IOFC JOINT WORKING PARTY OF EXPERTS ON INDIAN OCEAN AND WESTERN PACIFIC FISHERY STATISTICS

Bangkok, 1-5 December 1969

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
ROME, 1970

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PREPARATION OF THIS REPORT

At its first meeting in Rome, 16-20 September 1968, the Indian Ocean Fishery Commission decided to propose to the Indo-Pacific Fisheries Council the establishment of a joint working party to stimulate the development of fishery statistics within the Indo-Pacific regions. The Commission at its 13th Session held in Brisbane 14-25 October 1968 agreed to the proposal.

The Working Party met for the first time in Bangkok in December 1969 and the present document is its report as approved by the members.

Statements in this report do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal or constitutional status of any country, territory or sea area, or concerning the delimitation of frontiers.

Distribution:

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FAO Regional Fisheries Officers
Members of the Indo-Pacific Fisheries Council
Members of the Indian Ocean Fishery Commission
Working Party Members

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Report

Statistical system and classification - fishing craft, manpower, gear. Regions. Species. Requirements, recommendations, documents.

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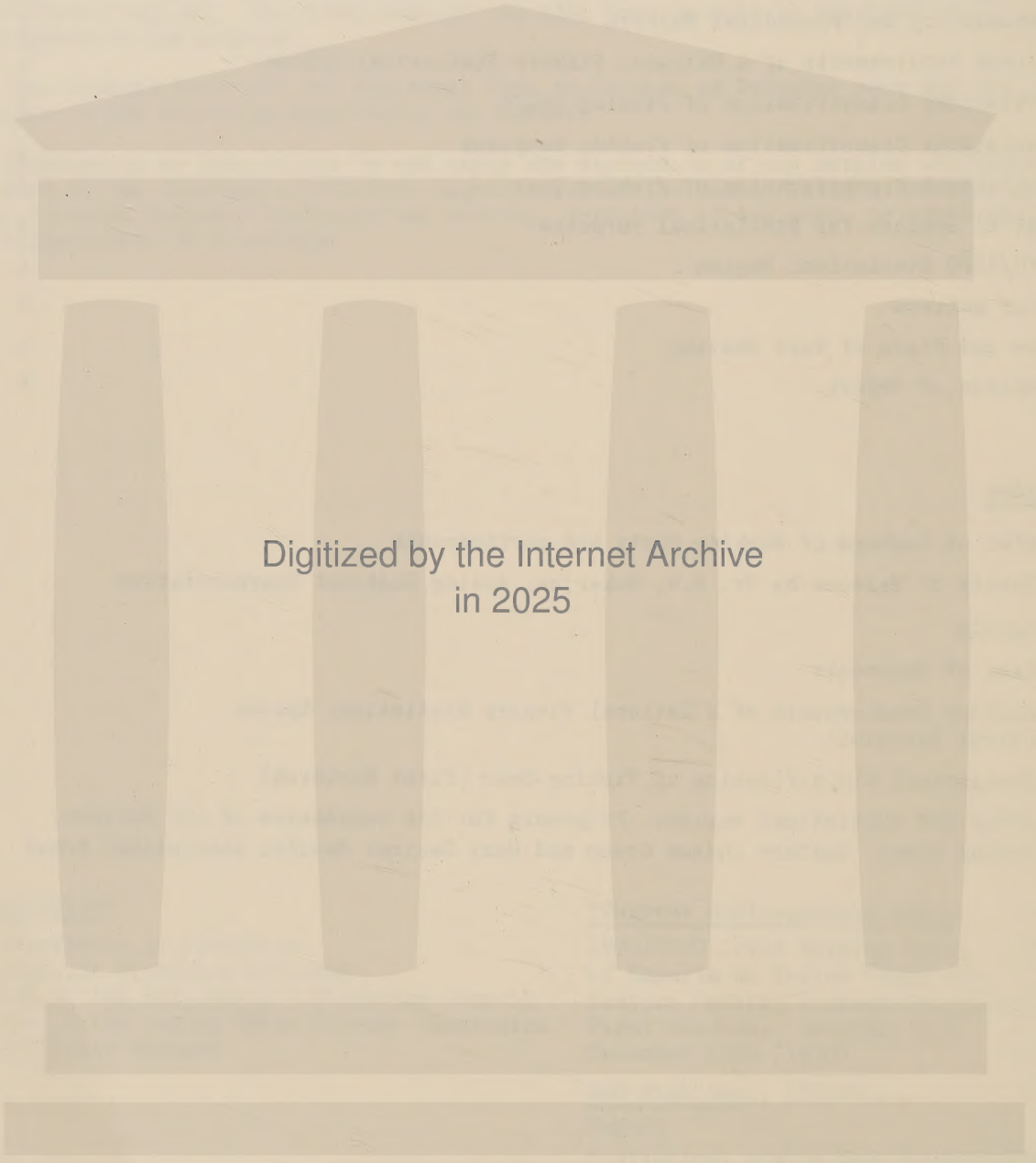

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1. INTRODUCTORY AND PROCEDURAL MATTERS

1.1 The first session of the IPFC/IOFC Joint Working Party of Experts on Indian Ocean and Western Pacific Fishery Statistics took place from 1 to 5 December 1969 at the FAO Regional Office for Asia and the Far East, Bangkok, Thailand. A list of members of the Working Party and other participants is at Appendix I.

1.2 The participants were welcomed in an opening address by Dr. H.N. Mukerjee, FAO Acting Regional Representative. See Appendix II.

1.3 The Working Party nominated Dr. Ichiro Yamanaka as Convenor and Mr. V.K. Rajagopalan as Vice-Convenor.

1.4 The Working Party adopted the Agenda at Appendix III.

1.5 The following rapporteurs were appointed:

Agenda Item 2	Mr. J. de la Cruz and Dr. T. Yamamoto
Agenda Items 3, 4, 5	Mr. Suh Hack Keun and Mr. D.J. Mackett
Agenda Item 6	Mr. W.F. Doucet and Mr. L.B. Nhwani
Agenda Item 7	Mr. L. Butler

2. MINIMUM REQUIREMENTS OF A NATIONAL FISHERY STATISTICAL SYSTEM

2.1 The Working Party considered the paper "Minimum Requirements of a National Fishery Statistical System" and recommends that:

A national fishery statistical system should, subject to the qualifications mentioned below, be able to provide statistics on the six items listed in Appendix I of the working paper, viz.

(i) Fishing Establishments and Fishing Labourers Households

(ii) Fishing Manpower

(iii) Fishing Craft

(iv) Fishing Units

(v) Catch and Fishing Effort

(vi) Value of Catch

2.2 The Working Party further recommends that:

Whilst the recommendation in paragraph 2.1 should apply to marine and inland fisheries and culture operations, priority should be given to the statistics of commercial fishing and that for the time being statistics on fishing units and fishing effort should be made available for at least the tuna long line, tuna pole and line, trawl (excluding beam trawl) and purse seine fisheries for the purpose of international comparisons. Subsistence fisheries should be given lower priority. Further, item 3 of the list at present covering fishing craft should be extended to include reference to number of non-movable stationary gears, and to water area in the case of aquaculture.

2.3 The Working Party recognized the value of statistics on fishing establishments for commercial fisheries, and recommends that:

The following minimum classification of fishing establishment be introduced:

(i) type

(ii) size

(iii) extent of dependence on fishing (this applies to fishing household only)

and that the FAO Secretariat prepare proposals for appropriate statistical categories for each of the above classifications for consideration by the second session of the Working Party.

2.4 The Working Party recognized the importance of fishery censuses for providing data on inventory items and for establishing the best frame for the designing of sample surveys to estimate catch and fishing effort and recommends that:

The pertinent resolution of the Eleventh Session of IPFC (Kuala Lumpur, 1964) and supporting material be made available to IOFC by the FAO Secretariat with a view to the passing of a similar resolution by the Commission.

2.5 Recognizing the importance of the survey of the current situation in fishery statistics carried out in most countries of the IPFC Region (see Appendix II of the Working Paper) the Working Party recommends that:

A survey of the fishery statistical system in IOFC member countries be undertaken as soon as possible, with emphasis on the primary phase statistics referred in paragraph 2.1.

2.6 The Working Party also noted that the survey referred to in paragraph 2.5 indicated that many countries of the IPFC Region still need to develop their statistical systems before being able to comply with the proposed minimum requirements. It was also thought that a similar situation might exist within the IOFC Region. In view of this the Working Party recommends that:

(i) FAO be requested to raise the level of assistance to member countries of IPFC and IOFC by increasing the number of international fishery statisticians assigned to developing countries on either a national or regional basis.

(ii) FAO request countries with developed statistical systems to supply lists of experts who might be available to assist those countries in need of assistance.

2.7 A revised version of "Minimum Requirements of a National Fishery Statistical System" incorporating the recommendations of the Working Party on this subject is at Appendix V of this report.

3. STATISTICAL CLASSIFICATION OF FISHING CRAFT

3.1 The Working Party considered the paper "Statistical Classification of Fishing Craft" and recommends that:

(i) For the purpose of data presentation in regional and international publications the following general fishing craft classification should be employed:

1. Powered craft
   1.1 Outboard Powered Craft
   1.2 Inboard Powered Craft [1/]

1.2.1	0-5	Gross Register Tons
1.2.2	5-10	
1.2.3	10-20	
1.2.4	20-50	
1.2.5	50-100	
1.2.6	100-200	
1.2.7	200-500	
1.2.8	500	

2. Non-powered Craft

(ii) A distinction should be made between total national fishing fleets and the numbers of craft (which may or may not be the same as the total fleet) fishing within a Statistical Area.

(iii) The FAO Secretariat should investigate the problem of calculating the Gross Register Tonnage of inboard powered fishing craft and present a paper on this subject to the next session of the Working Party.

4. STATISTICAL CLASSIFICATION OF MANPOWER

4.1 The Working Party considered the paper "Statistical Classification of Manpower" and discussed the economic and social reasons for maintaining records of fishing manpower. It was noted that fishing manpower statistics are available in but a few countries of the IPFC Region and that in view of this situation some countries plan to obtain manpower data by means of fishery censuses to be conducted within the next few years.

4.2 With regard to Appendix I of the working document (FAO Fisheries Circular 71, Notes on Completion of Forms: Statistics on Fishermen - Commercial and Subsistence) the Working Party recommends that:

(i) The first paragraph of Section 1.1 be amended to read as follows:

"The statistics on commercial and subsistence fishermen should cover all persons operating with or without fishing craft in freshwater, brackishwater and marine areas for the purpose of catching, landing or gathering aquatic animals (except whales) and plants. Persons engaged in aquaculture should also be included."

(ii) Section 2.2 should be revised to exclude all references to livelihood and that the terms

(i) Full-time
(ii) Part-time
(iii) Occasional

should be defined in terms of working time devoted to fishing by an individual.

1/ In each tonnage class, the lower limit is included and the upper limit excluded. Subdivision of the class "craft of 500 tons or more" to be considered further.

5. STATISTICAL CLASSIFICATION OF FISHING GEAR

5.1 The Working Party considered the paper "Statistical Classification of Fishing Gear" and with regard to Appendix II of this paper which proposed an international gear classification for use in the IPFC/IOFC Region, decided to restrict the discussion to marine fisheries (aquaculture excluded). The Working Party, keeping in mind the classifications in use in the ICNAF and ICES Regions decided to list gears in order of decreasing importance, or from the most sophisticated to the most primitive. The Working Party consequently agreed to the revised list at Appendix VI of this report and recommends that:

(1) The document Proposed International Statistical Classification of Fishing Gear for use in the IPFC/IOFC Region (First Revision) be considered by the next sessions of IPFC and IOFC for adoption in the Region.

(2) Steps be taken by the FAO Secretariat to survey the gears at present in use in IOFC member countries.

5.2 The Working Party also proposed certain principles to facilitate the harmonization of the proposed international classification with national classifications.

(1) In preparing a national classification of fishing gears the major groups (one digit), the groups (two digits) and the sub-groups (three digits) listed in Appendix VI should be adopted as far as possible.

(2) However, in countries where the pattern of a fishery is simple and there is only one gear within a major group (or a group or sub-group) individual gears might be listed in accordance with the order of the proposed international classification of fishing gears without ascribing them to major groups, groups and sub-groups.

(3) For purposes of international comparison the gears annotated in Appendix VI should be included in a national classification of gear wherever applicable, regardless of the size of fisheries employing such gears.

6. LIST OF SPECIES FOR STATISTICAL PURPOSES

6.1 The Working Party reviewed the paper "Draft List of Species for Statistical Purposes: Western Indian Ocean, Eastern Indian Ocean and Western Central Pacific" and the Appendices thereto and also examined a working paper on the Current Status of Species Breakdown of Catches and Landings for the Countries of Asia and Oceania.

6.2 The Working Party recognized the need for establishing a list of species as well as for the setting up of appropriate statistical categories and classification systems, especially for purposes of regional studies. In view of the wide gaps in the knowledge of the species prevailing in the region, it was felt that emphasis should first be centred on species currently exploited on a commercial scale, and to the end of facilitating the species identification work involved, it recommends that:

Fishery specialists in each of the member countries be asked by the FAO Secretariat to prepare national lists of species (identified by genera or families if only that is possible) known to enter commercial channels, grouped according to the commercial practices in a particular country, and submit same at an early opportunity for coordination by the Working Party.

6.3 In its review of the FAO Proposals for the Revision of the International Standard Statistical Classification of Aquatic Animals and Plants (ISSCAAP) at Appendix II (FAO Fisheries Circular 232), the Working Party first considered the fitness of the nine broad categories Divisions 1-9 at Appendix B of Fisheries Circular 232 for the IPFC/IOFC Region. Discussion led to general agreement that the divisions could be accepted as revised.

6.4 The Working Party discussed in some detail the species groups which should constitute Divisions 1, 2 and 3, viz., Freshwater Fishes, Diadromous Fishes and Marine Fishes, and made the following proposals for consideration by FAO:

(a) The group "miscellaneous", appearing under each Division, should read "other and unsorted".

(b) Division 1

Group 11	No change
12	Catfishes
13	Anabantidae (Anabas) Osphronemidae (Trichogaster, Parophiocephalus) e.g. snake-heads, climbing perches, etc.
14	Tilapias and other cichlids
15	Other and unsorted freshwater fishes (Silversides and sand smelts should not be included)

(c) Division 2

Group 22	River eels - delete "river"
23	Should not include Argentinidae New group for silversides and sand smelts (Atherinidae)

(d) Division 3 Should include Argentinidae
Billfishes should be included in Group 36 instead of Group 37

6.5 While the details noted under (6.4) above were discussed with reference to the composition of Divisions 1, 2 and 3, the Working Party had no time to enter into the matter in depth and species groupings relating to Divisions 4 to 9 were not examined. Nor was it possible to comment on Appendix I (FAO Fisheries Circular 246), other than generally approve the approach to the problem. At the same time it was generally recognized that the Working Party was not fully competent to deal adequately with a subject as specialized as the one at hand; and in the interest of carrying out this important work expeditiously and well, it recommends that:

> FAO give consideration to the early recruitment and assignment of two biologists to the Region - one to IPFC and the other to IOFC - for a period of two years to establish the statistical and reference lists referred to in the Working Paper and in Appendix I (FAO Fisheries Circular 246) thereto.

6.6 A document "The Preparation of Species Identification Sheets for Statistical Purposes" (such sheets would be used by field workers) which has been adopted in the CARPAS area, was distributed to members of the Working Party for information and future consideration. The Secretariat requested that comments respecting the possible implementation of this project in the IPFC/IOFC Region be sent to the FAO Secretariat at an early opportunity.

7. IPFC/IOFC STATISTICAL REGION

7.1 The Working Party considered the working paper "IPFC/IOFC Statistical Region" and decided to restrict its discussion to:

(i) The development of general principles concerning the need for major sea areas and the defining of the limits of such areas.

(ii) The defining of the boundaries of three major areas for which it was thought that the IPFC/IOFC should require regional statistics, viz:

(a) The Western Indian Ocean Statistical Area

(b) The Eastern Indian Ocean Statistical Area

(c) The Western Central Pacific Statistical Area

7.2 The Working Party recognized that the division of the oceans of the world into large areas was useful to permit the study of the general outline of the development of fishery exploitation both in the biological and related economic sense and recommends that the following factors and principles should be considered when the boundaries of a large statistical sea area are being defined:

(i) The natural divisions of the oceans and seas

(ii) The structure of the resources and the environmental conditions within an area

(iii) The statistical sea area boundaries already established for international purposes

(iv) For purposes of general stock identification, an ocean should be divided into tropical and temperate zone seas. Such zones should be further divided into eastern and western areas to facilitate the study of the different fisheries on the opposite sides of oceans[2/]

(v) Where the boundary of a sea terminates at a coast, cognizance should be taken of the pertinent national fisheries and statistical practices

(vi) Unless there are other over-riding reasons, boundary lines should be drawn along 5^{0} lines of longitude and latitude

(vii) Changes in area boundaries should not be made frequently

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2/ Even within the same ocean the structure of the resources and the environmental conditions differ greatly between tropical and temperate zones and between sea areas off the opposing continents. Most fisheries resources are considered as related to a given continent and different stocks are found off each continent even for the same species. Further owing to the differences in the development of fisheries off each continent, the extent to which resources have been exploited will vary between the eastern and western areas of an ocean.

7.3 The Working Party agreed that the three Statistical Areas referred to in paragraph 7.1 should be established and recommends the following boundaries (see Appendix VII):

Western Indian Ocean Statistical Area

The Boundary with the Mediterranean Sea

The northern mouth of the Suez Canal, which is the south-eastern limit of the Mediterranean Statistical Area established by the General Fisheries Council for the Mediterranean.

The Boundary with the Atlantic Ocean

A line along longitude 30°E from the African Coast to latitude 50°S, even though the Convention for the South East Atlantic has proposed a boundary along longitude 40°E.

The Southern Boundary

Latitude 50°S which is, in general, the line of the antarctic convergence.

The Eastern Boundary

A line from a point at latitude 10°N on the coast India due east to longitude 85°E, then due south to latitude 5°N, then due west to longitude 80°E, then due south along longitude 80°E to latitude 50°S.

Eastern Indian Ocean Statistical Area

The Western Boundary

See Eastern Boundary of the Western Indian Ocean Statistical Area.

The Southern Boundary

A continuation of the Southern Boundary of the Western Indian Ocean Statistical Area due east along latitude 50°S to longitude 150°E.

The North Eastern Boundary

A line due south from the tip of the Malaysian peninsula to the coast of the Island of Sumatra, then a line as indicated in the map at Appendix VII following the islands of the Indonesian archipelago as far as longitude 115°E then

either (a) continuing through the islands to longitude 125°E and then due southwards to the Australian coast

or (b) a line due south along longitude 115°E to latitude 15°S and then due eastwards to the Australian coast.

The FAO Secretariat were asked to pursue the matter further with the pertinent Australian, Indonesian and Malaysian authorities and report to the Working Party at its next session.

The South Eastern Boundary

A rhumb line running south east from Cape Howe on the coast of Australia to longitude 150°E and then due south to latitude 50°S.

The Western Central Pacific Statistical Area

The Western Boundary

See the North Eastern Boundary of the Eastern Indian Ocean Statistical Area.

The Northern Boundary

A line across Hainan Strait along longitude 110°E and a line from Hainan Island running eastwards along latitude 20°N as far as the International Date Line. It was however thought that in the area of the East and South China Seas latitude 25°N might form a more satisfactory boundary, and the FAO Secretariat were asked to investigate the matter further with the pertinent Hong Kong, Japanese, Korean and Taiwan authorities.

The Southern Boundary

One suggestion was a line running due North from the Australian coast along longitude 150°E to the coast of New Guinea and then due east along latitude 10°S to the International Date Line. An alternative suggestion was a line due east from the Australian coast along latitude 25°S as far as the International Date Line. The FAO Secretariat were consequently instructed to pursue the matter further with the pertinent Australian authorities and the South Pacific Commission.

The Eastern Boundary

The International Date Line.

7.4 The question of defining other major sea areas for which the IPFC/IOFC might wish to collect, collate and publish area statistics is to be considered at a later session of the Working Party.

8. OTHER MATTERS

8.1 In view of the importance of Fishery Censuses already referred to at paragraph 2.4 the Working Party recommends that:

The Secretariat consider the preparation of a practical manual on the subject.

8.2 The Working Party considered its future programme and decided it would suffice to continue work on the subjects already in hand.

9. DATE AND PLACE OF NEXT MEETING

9.1 The Working Party recommends that:

The second session of the Working Party should take place in the first half of 1971.

No recommendation was made concerning the venue.

10. ADOPTION OF THE REPORT

10. The Report of the First Session of the IPFC/IOFC Joint Working Party of Experts on Indian Ocean and Western Pacific Fishery Statistics was adopted.

Appendix I

PARTICIPANTS

i. Members of the Working Party

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Dr. T. Yamamoto
Regional Fishery Statistician, Bangkok

Appendix II

WELCOME SPEECH

by

H.N. Mukerjee

Acting Regional Representative

Distinguished Participants:

On behalf of Mr. Ahsan-ud-Din, Regional Representative of FAO, who is unavoidably absent on duty travel, it is my most pleasant duty to welcome the distinguished participants to this first meeting of the IPFC/IOFC Joint Working Party of Experts on Indian Ocean and Western Pacific Fishery Statistics. We will try to provide you with all possible facilities from this Regional Office, so that your deliberations may be brought to a most successful conclusion.

2. As you know, the First Session of the Indian Ocean Fishery Commission held in September 1968 in Rome and the 13th Session of the Indo-Pacific Fisheries Council held in October 1968 in Brisbane resolved to establish a Working Party on Fishery Statistics for the Indian and Western Pacific Oceans to find out the ways and means of developing fishery statistics in these regions and to work out a number of statistical standards for purposes of international comparison. This development was long overdue, and hence it is gratifying to note that we are meeting today for the above objective.

3. In the past two decades, the question of fishery statistical standards has been discussed very often amongst the countries of Europe and North America. The first FAO sponsored conference dealing with fishery statistics was held in Copenhagen in 1952. Thereafter, a more or less similar FAO conference on fishery statistics was held in Edinburgh in 1958, in collaboration with ICES and ICNAF. As a result of this conference, the necessity of standardization of fishery statistics was keenly recognized, and hence the Coordinating Working Party on Atlantic Fishery Statistics which is known as CWP was established.

4. So far, this Coordinating Working Party has held several meetings, mostly in Rome. Later, more or less similar working parties on fishery statistics were established for the south-western part of the Atlantic Ocean and for the Mediterranean. However, up till now, no such working party has met for the regions of the Indian and Western Pacific Oceans, and thus today's meeting is the first of its kind for Asia, the Far East and the eastern part of Africa.

5. As you are aware, the present status of fishery development in these regions is quite different from that in the Atlantic Ocean, being of a very primitive nature, with the exception of a few countries in the Far East. Naturally, this situation will have to be taken into account in the establishment of statistical standards of fisheries for our regions. I, therefore, hope that as a result of the expert deliberations of the present working party, it will be possible to suggest the most appropriate statistical standards, which will meet with the various requirements of the countries in the above regions.

Thank you.

Appendix III

AGENDA

		Document
1.	PROCEDURAL AND INTRODUCTORY MATTERS	
	1.1 Opening of Meeting	
	1.2 Nomination of convenor	
	1.3 Adoption of agenda and timetable	
	1.4 Nomination of rapporteurs	
2.	MINIMUM REQUIREMENTS OF A NATIONAL FISHERY STATISTICAL SYSTEM	IPFC/IOFC/ST/9
3.	STATISTICAL CLASSIFICATION OF FISHING CRAFT	IPFC/IOFC/ST/7
4.	STATISTICAL CLASSIFICATION OF FISHING MANPOWER	IPFC/IOFC/ST/4
5.	STATISTICAL CLASSIFICATION OF FISHING GEAR	IPFC/IOFC/ST/6
6.	LIST OF SPECIES FOR STATISTICAL PURPOSES	IPFC/IOFC/ST/8
7.	IPFC/IOFC STATISTICAL REGION	IPFC/IOFC/ST/5
8.	OTHER MATTERS	
9.	NEXT MEETING	
10.	ADOPTION OF REPORT	

Appendix IV

LIST OF DOCUMENTS

IPFC/IOFC/ST	1	Annotated Provisional Agenda
	2	Provisional Time Table
	3	List of Documents
	4	Statistical Classification of Fishing Manpower
	5	IPFC/IOFC Statistical Region
	6	Statistical Classification of Fishing Gear
	7	Statistical Classification of Fishing Craft
	8	Draft List of Species for Statistical Purposes
	9	Minimum requirements of a National Fishery Statistical System
	10	FAO Fisheries Circular 210
		Western and Eastern Indian Ocean: Nominal Catch Statistics 1967
	11	FAO Yearbook of Fishery Statistics Vol. 26: Catches and Landings 1968

Appendix V

MINIMUM REQUIREMENTS OF A NATIONAL FISHERY STATISTICAL SYSTEM

(FIRST REVISION) [1]

1. Introduction

In accordance with the terms of reference of the IPFC/IOFC [2] Joint Working Party of Experts on Indian Ocean and Western Pacific Fishery Statistics a first paper on this subject was prepared by the FAO/TA Regional Fisheries Statistician, Bangkok, for discussion at the first session of the working party which was held in Bangkok during 1-5 December 1969. This revised version incorporates the recommendations of the working party.

Section 2 of this paper presents the type of statistics that might satisfy the minimum needs of a Fishery Administration together with reasons for their choice while Section 3 reviews the current situation of national fishery statistics as far as the types of statistics suggested in Section 2 are concerned.

Although a Fishery Administration requires statistics with respect to fish processing and fish marketing, this paper deals with those of the primary phase of a fishery only i.e. fish production.

2. Type of Fishery Statistics Needed

The type of fishery statistics which are considered to be indispensable to the understanding of the primary phase of a fishery are systematically listed in Annex A, together with their statistical coverage and desired periodicity. The statistical items there listed have been chosen so as to clarify all aspects of the primary phase of a fishery as described below:

i. For the purpose of operating a fishing business, an economic unit to be called a fishing establishment (see Section 2.1) is first formulated.

ii. For carrying on fishing, a fishing establishment utilizes fishing manpower (see Section 2.3) and usually acquires fishing craft (see Section 2.2).

iii. To fish in a particular manner a technical unit combining fishing craft, gear and fishing manpower is formed. This technical unit is called a fishing unit (see Section 2.4).

iv. When a fishing unit operates in a fishery, fishing effort is expended to to realise catch (see Section 2.5).

The significance of these statistical items for the study of a fishery is developed below in some depth.

2.1 Fishing Establishment and Fishing Labourers' Household

When a fishery is undeveloped, fishing is undertaken by households which fish on their own account with their own fishing equipment. However, with the development of a fishery some households fishing on their own account develop into more sophisticated establishments employing fishing labourers, and parallel with this change other such households cease fishing on their own account to become suppliers of fishing labourers.

1/ February 1970

2/ IPFC Indo-Pacific Fisheries Council
IOFC Indian Ocean Fishery Commission

Such a structural change of a fishery can be illustrated as follows:

(III)	Fishing Company, etc.	
(II)	Fishing Household (own account) employing fishing labourer(s)	Economic unit (Fishing establishment)
(I)	Fishing Household (own account)	
(I')	Fishing Labourers Household 3/	Non-economic unit

In all countries changes in the structure of a fishery are continuously taking place, although the tempo may differ from country to country. In most countries in the IPFC and IOFC Regions, Fishing Households (own account) still predominate, whereas, in the developed countries of Europe and North America, fishing companies employing fishing labour have replaced households. In the study of a fishery economy such a structural change of a fishery needs to be reviewed by a fishery census or a similar survey at, say, five year intervals.

In a strict sense fishing establishments would include only categories (II) and (III) above, However, since Fishing Households (own account) are also considered to be economic units, they will be treated as fishing establishments as well.

In most of the developing countries, the registration of fishing craft is often poorly developed and the majority of fishermen are not organized in societies. Under such conditions, which predominate in the IPFC and IOFC Regions, statistics of fishing craft and manpower are best obtained from fishing establishments and fishing labourers households by means of a fishery census or similar survey. Statistics of fishing craft are obtained by contacting fishing establishments (categories (I), (II) and (III) above) and those of manpower from fishing households (own account) and fishing labourers households (categories (I), (II) and (I') above). 4/ Therefore, even from the viewpoint of statistical technique these two items are indispensable.

In the study of the economic structure of a fishery a clear distinction should be made between fishing establishment and fishing labourers household, since as indicated above the former is an economic unit while the latter is not. The significance of this distinction for statistical purposes is developed below.

3/ This category refers to the household whose members are employed by other households (or companies) as fishing labourers and which does not fish on its own account. A household which fishes on its own account and also provides fishing labourers is placed in category (I).

4/ There are two ways of counting the number of fishermen. One is the economic unit approach which requires the contacting of fishing establishments which use fishing labour from either family members or other sources. The other approach is the residence approach which requires the contacting of the sources of fishermen, i.e. the fishing households (own account) and the fishing labourers households. Experience has indicated that the former method involves some danger of double counting, since the same person may be employed by two different fishing establishments during the course of a year because of the seasonal nature of a fishery. It is, therefore, considered that fishing labourers households and fishing households (own account) are the best survey units for counting the actual number of fishermen without duplication. See also Section 2.3.

(a) Fishing Establishment

A fishing establishment, since it is an economic unit that has an intention to capture or cultivate aquatic resources, is the only medium through which a fishery administration can be effective. A government may pursue a policy for developing a fishing industry by encouraging the introduction of improved fishing techniques and gear; by assisting the construction of an efficient fishing fleet; by the construction of infra-structural facilities such as harbours, fish markets, cold stores and ice-making factories; by the forming of fishermen's oragnizations, etc. These aims are usually effected by means of such government services as extension work, subsidies, loans with reasonable rate of interest, etc. and in a market economy country such services depend entirely on the voluntary response of fishing establishments for their success.

It therefore follows that a knowledge of the number and nature of fishing establishments in a country is a pre-requisite for a government desiring to take any action. Since, depending upon the subject matter in hand, there may be need for different government schemes for different types of establishments, the establishments may have to be classified according to the type of management such as individual management, fishing company, fishing cooperative society, state fishing corporation, etc.

(b) Fishing Labourers Household

In many countries fishing labourers households are for some purposes grouped with fishing households (own account). It is necessary, however, to be clear that the former, since it is not an economic unit, would not be considered by a fisheries administration in the manner mentioned in (a) above. It might be more natural for a fishing labourers household to be considered as a subject for social policies through which a government might try to improve living standards and social welfare e.g. by establishing crew labour standards, by providing a social guarantee system for crews and their families, by constructing fishermen's houses, etc. For these reasons fishing labourers households need to be clearly distinguished from fishing households (own account).

2.2 Fishing Craft

Regardless of the type of economic activity both the amount of capital invested and manpower utilized are considered as being among the most important input items requiring study. When statistics of these two input items are known together with those of corresponding outputs the relationship between input and output can also be usefully studied.

In an interview with a fisherman, a direct enquiry as to the amount of capital invested does not usually obtain a correct answer. Therefore the assumption is made that the size of fishing craft more or less corresponds to the amount of capital invested in a fishery, and thus data on the number of fishing craft by size are collected. The type of vessel and methods of fishing employed are also factors of importance when classifying vessels (see 2.4 below).

For economic analysis, if various relevant data concerning fishing craft are known together with those on catch and value, several useful indices such as catch per craft, catch per gross registered ton, catch per unit horse power, etc. which represent the material input productivity of a fishing industry can be measured, for each type of unit fleet and over all fleets.

Further, for studies in fish population dynamics, the size of a fishing fleet (grouped by type of vessel and gear employed and usually in terms of tonnage or horse power) represents fishing power. Furthermore, when no data on fishing effort such as hours spent fishing, the number of hauls, etc. are available, the size of a fishing fleet can be used as a rough indication of fishing effort.

On the other hand, although in most cases the operation of stationary gears requires the use of fishing craft, knowledge of the number of stationary gears set in the water is more useful for the study of fish population dynamics. Therefore, except in the case of minor stationary gears like portable traps the number of stationary gears set in the water is substituted for the number of fishing craft.

The cultivation of aquatic animals and plants requires the employment of a certain area of water and consequently for this type of fishery the area of water under cultivation is a more meaningful input item than the number of fishing craft. Therefore, in the case of aquatic culture, "water area in use" replaces, in most cases, "number of fishing craft" as an input item.

2.3 Fishing Manpower

Fishing manpower is the number of persons who engage in the actual operations involved in the capture or cultivation of aquatic resources. By definition, the persons who work in trades related to fishing operations such as net repairing, loading fishing vessels for sea, unloading fish, administrative work in fisheries management, etc., are excluded from fishing manpower. Further in the case of culture only the persons (including both family members and employed workers) working directly in the cultivation operations are counted as fishing manpower. This means that the persons who engage in stocking fry and fingerlings, feeding, fertilizing, replacing water, harvesting, maintaining facilities including ponds, etc. are included, but the owner of a fish pond or cultivation facilities and his clerk who do not engage in the actual cultivation operations would be excluded.

When data on fishing manpower are available together with those on catch and value, a crude measure of labour productivity is obtainable by dividing the latter by the former As fishing may often be seasonal not all fishermen are full time workers. The labour productivity of a fishery measured in the manner described above may, therefore, be somewhat under-estimated and is not directly comparable with similar measures for other industries. Nevertheless, such a labour productivity can be used, at least, for comparisons within the fishery sector.

2.4 Fishing Unit

A fishing unit is a technical unit operating in a fishery and comprises a combination of fishing craft, gear and manpower. Data on fishing units become meaningful only when such a unit is identified according to the type of gear employed. Usually, a fishing unit contains a single boat but in fisheries such as pair trawling and purse seining it contains two boats or more.

Data on fishing units are essential, especially when efficient gear is employed, since the limitation of the number of fishing units may be required for the conservation of fisheries resources. Furthermore, when adequate data on fishing effort are not available, the number of fishing units can be used in its place in preference to the number of craft referred to above.

2.5 Catch and Fishing Effort

The need for catch and fishing effort data for stock assessment has been stressed in many other papers. However, from the standpoint of statistical techniques these are the most difficult items to deal with under the prevailing conditions of the fishing industries in the IPFC and IOFC Regions. For the purpose of stock assessment, catch has to be classified by species, by type of gear and by area of capture. Sometimes, even within the same category of gear, different sizes of gear are used with different sizes of fishing craft. In such a case catch by type of gear will have to be further classified by the size of fishing craft used.

In view of the complexity of fishing gear employed in the IPFC and IOFC Regions it is not feasible to collect fishing effort data for all fisheries. However, attempts should be made to collect such data for at least the major fisheries that exploit commercially important stocks. For the other fisheries, only catch data by species should be collected, but, if this is not possible at least total catch figures are necessary. As to the reference period, data for short periods (quarters, months, etc.) are the most useful so as to give an indication of seasonality. Where this is not practicable, at least annual figures should be made available.

2.6 Value of Catch

Total catch expressed in terms of quantity is often used to disclose the size of a fishing industry as a whole. It also often happens that an annual series of total catch is used as an index to show the ups and downs of a fishing industry. However, the use of total catch in such a way may cause a great deal of misunderstanding, since the size of annual total catch is often affected to a great extent by increases or decreases in the catch of low price fish. It is clear that an increase in annual total catch which has occurred because of a good harvest of low price fish does not necessarily mean a real growth of a fishing industry in money terms.

In order to avoid such a misunderstanding catch data should be expressed in both physical and value terms. In this way, not only the ups and downs of a fishing industry can be properly studied but also the economic size of a fishing industry can adequately be compared with those of other industries. However, in order to know the real growth of a fishing industry it is necessary to develop production indices particularly when the value of a national currency varies from year to year.

Catch is usually valued by multiplying quantity caught by the average weighted price for each species.

3. Current Situation of Fishery Statistics

The current situation of the statistical items listed in Annex A was reviewed for each country using the FAO Yearbook of Fishery Statistics, various FAO Fisheries Bulletins and national publications as source material. The results are listed in Annex B. Owing to the lack of material available, the review is not always very complete and this may lead to some difficulties. For the convenience of the review, Pakistan is divided into the West and the East, so that although the review covers seventeen countries it will refer to eighteen "countries".

The current situation of fisheries statistics in the region of IPFC can be summarized as follows.

3.1 Fishing Establishment

Of eighteen "countries" reviewed, statistics on this item were available in six. It was, however, noted that statistics on these items were to become available very soon in some of the remaining twelve countries where fishery censuses or surveys had been planned. It is also to be noted that once such surveys are implemented not only would statistics of fishing establishments become available but also those of other fisheries inventory items such as fishing manpower, fishing craft and fishing units.

At the time of the survey, first fishery censuses had been planned and were soon to be undertaken in Korea, the Philippines, West Malaysia, India, and Pakistan and it was noted that second fishery censuses might be implemented in Taiwan and Thailand around 1973. Even in the remaining countries, it was highly probable that fishery censuses would be undertaken in close collaboration with the 1970 population and agricultural censuses.

3.2 Fishing Craft

These statistics were available in all of the countries reviewed, but the reliability was high only in countries such as Korea, Japan, Taiwan, West Malaysia, Ceylon, Australia and New Zealand, where registration of fishing craft was fairly well implemented. In the remaining countries the accuracy of these statistics could be improved if a fishery census or a similar survey were undertaken.

3.3 Fishing Manpower

The current situation for fishing manpower statistics was more or less similar to that for fishing establishments. In spite of the fact that statistics on fishing craft were available in all the countries reviewed, manpower statistics were available in ten only. Even in the countries which maintained fishing manpower data, the reliability was, in many instances, unsatisfactory.

3.4 Fishing Unit

These statistics were available in the countries where either a fishing license system had been well established or a fishery census had been taken.

3.5 Quantity of Catch

As in the case of the statistics of fishing craft, these statistics were available in all of the countries reviewed, but with the exception of West Malaysia and Ceylon the statistics in tropical countries were very unreliable.

Species breakdown in most of the tropical countries was either too simple or non-existent with the result that catch statistics could not be properly utilized for stock assessment. Gear classification for the further breakdown of catch statistics had also been very little developed in most of the tropical countries. Fishing area classification had been developed only in the developed or semi-developed countries of the Far East and Oceania, but it was, in most cases applied only to major fisheries like trawl, tuna longline, etc. Classification by FAO major fishing area had been adopted in Japan only.

3.6 Value of Catch

Value of catch was available and fairly reliable in the countries of the Far East and Oceania. However, in the rest of the countries such data were either unreliable or did not exist.

3.7 Fishing Effort

Fishing effort data were available only in developed or semi-developed countries and were mostly confined to major fisheries.

4. General

Above all, it can in general be said that the fishery statistical systems in most of the tropical countries were much less developed than those in the countries of the Far East and Oceania. In this connection it is thought that the taking of a fishery census as resolved at the Eleventh Session of IPFC held in Kuala Lumpur in October 1964 would be a useful step towards improving such a situation. Such censuses would provide not only all required fisheries inventory data, but also an excellent frame for the designing of sample surveys to estimate the quantity of catch.

Appendix V (Annex A)

Minimum Requirements of a National Fishery Statistical System
(In the Primary Phase of a Fishery)

Type of Statistics	Statistical Coverage (Commercial fishing)	(Subsistence fishing)
1(a) Fishing Establishment		
Total number	A	Q/D
by type	A	
by the extent of dependency on fishing (fishing household (own account) only)	A	
by size	A 1/	
(b) Fishing Labourers Household		
Total number	A	Q/D
2(a) Fishing Craft		
Total number	A	Q/D
by size class	A	
(b) Non-movable Stationary Gears 2/		
Total number	A	Q/D
(c) Water Area (Aquaculture)		
Total area	A	Q/D
3 Fishing Manpower		
Total number	A	Q/D
by the extent of dependency on fishing	A	
4 Fishing Unit		
Number by type of gear employed	A 3/	
5 Catch		
5.1 Quantity		
Total	M/A	Q/D
by species	M/A	
by type of gear	M/A	
by area of capture	M/A	
5.2 Value		
Total	M/A	
by species	M/A	
6 Fishing Effort	M/A 4/	

A Annually
A/Q Annually or Quinquennially, preferably Annually
M/A Monthly or Annually, preferably Monthly
Q/D Quinquennially or Decennially, preferably Quinquennially
1/ For developed fisheries only
2/ Groups 8.1 and 8.2 of Proposed International Statistical Classification of Fishing Gear for use in the IPFC/IOFC Region (First Revision). IPFC/IOFC/ST/12, Appendix VI
3/ At least for major marine fisheries: tuna long line, tuna pole and line, trawl (excluding beam trawl) and purse seine fisheries
4/ For major marine fisheries only

CURRENT SITUATION OF FISHERY STATISTICS IN THE IPFC REGION - FEBRUARY 1970 (Continued)

Country	Fishing Establishments		Fishing Manpower		Fishing Craft		Fishing Units
	Total number	By type of management	Total number	By type	Total number	By size classes	(number)
Korea	A' 1/	- 1/	A' 1/	- 1/	A	A	A 2/
Japan	A	A	A	A	A	A	A
Taiwan	A	A	A' 1/	A' 1/	A	A	A 2/
Hongkong	-	-	-	-	A'	-	-
Philippines	- 1/	- 1/	- 1/	- 1/	A' 1/	A' 1/	A' 1/
Indonesia	-	-	A'	-	A'	A'	-
S. Vietnam	A'	-	A'	-	A'	A'	A'
Cambodia	-	-	-	-	A'	A'	- 5/
Thailand	A	A	A	-	A	A	A 2/
W. Malaysia	- 1/	- 1/	A' 1/	- 1/	A	A	A
Singapore	-	-	-	-	A	A	-
Burma	-	-	-	-	-	-	-
E. Pakistan	A' 1/	- 1/	A' 1/	- 1/	A' 1/	A' 1/	A'
India	- 1/	- 1/	- 1/	-	A' 1/	- 1/	-
Ceylon	-	-	-	-	A	A	-
W. Pakistan	-	-	-	-	A'	-	-
Australia	- 5/	- 5/	A ?	-	A	A	- 5/
New Zealand	- 5/	- 5/	A	-	A	A	- 5/

A = Available and reliable

A' = Available but not reliable or incomplete

- = Not available

1/ = Reliable data resulting from a Fishery Census to become available shortly

2/ = Available for major fisheries

3/ = Action taken for the improvement of data

4/ = Catch of marine fisheries somewhat reliable, but that of inland fisheries not

5/ = Easily obtainable by tabulating data available to the government

CURRENT SITUATION OF FISHERY STATISTICS IN THE IPFC REGION - FEBRUARY 1970 (Concluded)

Country	Quantity of Catch				Value of Catch		Fishing effort
	Total quantity	By species	By type of gear	By area of capture	Total value	By species	
Korea	A	A	A	A 2/	A	A	A 2/
Japan	A	A	A	A	A	A	A
Taiwan	A	A	A	A 2/	A	A	A 2/
Hongkong	A	A	-	A 2/	A	A	A 2/
Philippines	A' 3/	A' 3/	A' 3/	A' 2/	A'	A'	-
Indonesia	A'	-	-	-	-	-	-
S. Vietnam	A'	A'	-	-	A'	-	-
Cambodia	A'	-	-	-	A'	-	-
Thailand	A' 3/	A' 3/	- 3/	-	A'	-	A 2/
W. Malaysia	A	A	A	-	A'	A'	A 2/
Singapore	A	-	A	-	A	-	-
Burma	A'	-	-	-	A'	-	-
E. Pakistan	A' 3/	A' 3/	A' 3/	-	A'	A'	-
India	A 4/	A	-	-	-	-	-
Ceylon	A	A'	-	-	A'	A'	-
W. Pakistan	A	A'	-	-	A'	A'	-
Australia	A	A	A ?	A	A	A	A ?
New Zealand	A	A	A	A 2/	A	A	A 2/

A = Available and reliable

A' = Available but not reliable or inoomplete

- = Not available

2/ = Available for major fisheries

3/ = Action taken for the improvement of data

4/ = Catch of marine fisheries somewhat reliable, but that of inland fisheries not

PROPOSED INTERNATIONAL STATISTICAL CLASSIFICATION OF FISHING GEAR FOR USE IN THE IPFC/IOFC REGION (FIRST REVISION) (MARINE FISHERIES - FISH CULTURE EXCLUDED) [1]

1. Trawls
   - 1.1 Otter trawls
     - 1.1.1 Side trawls [2]
     - 1.1.2 Stern trawls [2]
   - 1.2 Pair trawls (two boat trawls) [2]
   - 1.3 Beam trawls

2. Seine Nets
   - 2.1 Boat Seine [2]
     - 2.1.1 Danish Seines
     - 2.1.2 Other boat seines
   - 2.2 Beach seines

3. Surrounding Nets
   - 3.1 With ring [2]
     - 3.1.1 One boat purse seine
     - 3.1.2 Two boat purse seine
   - 3.2 Without ring

4. Gill Nets
   - 4.1 Drift gill nets
   - 4.2 Encircling gill nets
   - 4.3 Set gill nets

5. Lift Nets
   - 5.1 Boat lift nets
   - 5.2 Fixed lift nets
   - 5.3 Portable lift nets (smaller hand lift nets)

6. Other Mobile Nets
   - 6.1 Cast net
   - 6.2 Push net
   - 6.3 Scoop net
   - 6.4 Drive-in net
   - 6.5 Others

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[1] 1 Major Group
1.1 Group
1.1.1 Sub-group

[2] See paragraph 5.2

7. Hooks and Lines

   7.1 Long Line
      7.1.1 Tuna long line [2/]
      7.1.2 Other drift long lines
      7.1.3 Set long lines (bottom long lines)

   7.2 Pole and hand lines
      7.2.1 Tuna (including skipjack) pole and line [2/]
      7.2.2 Others

8. Stationary Gears

   8.1 Guiding barriers
   8.2 Bag net on stakes (stow net)
   8.3 Portable traps
   8.4 Others

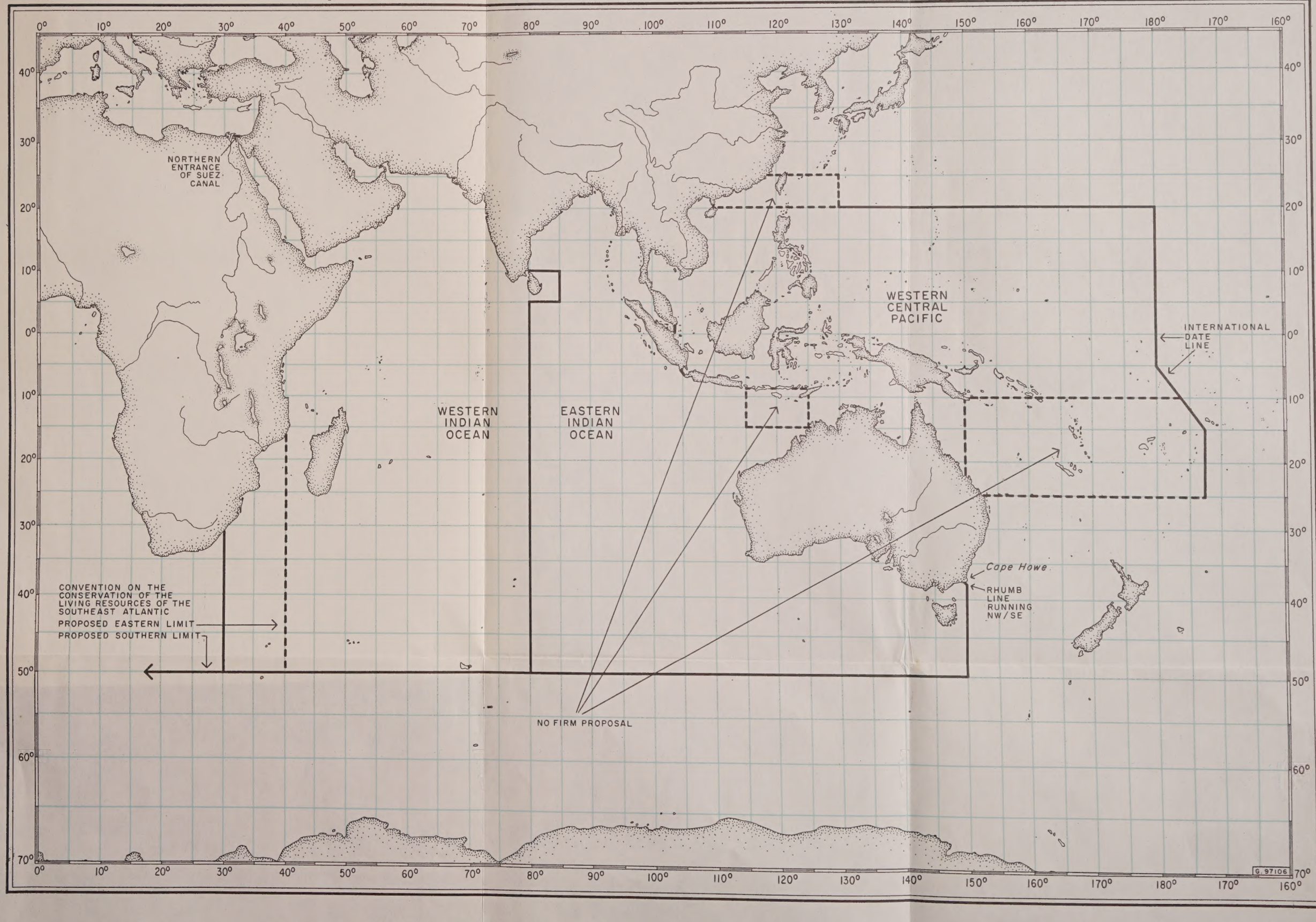
9. Manual Gears for Collecting Shellfish and Seaweed

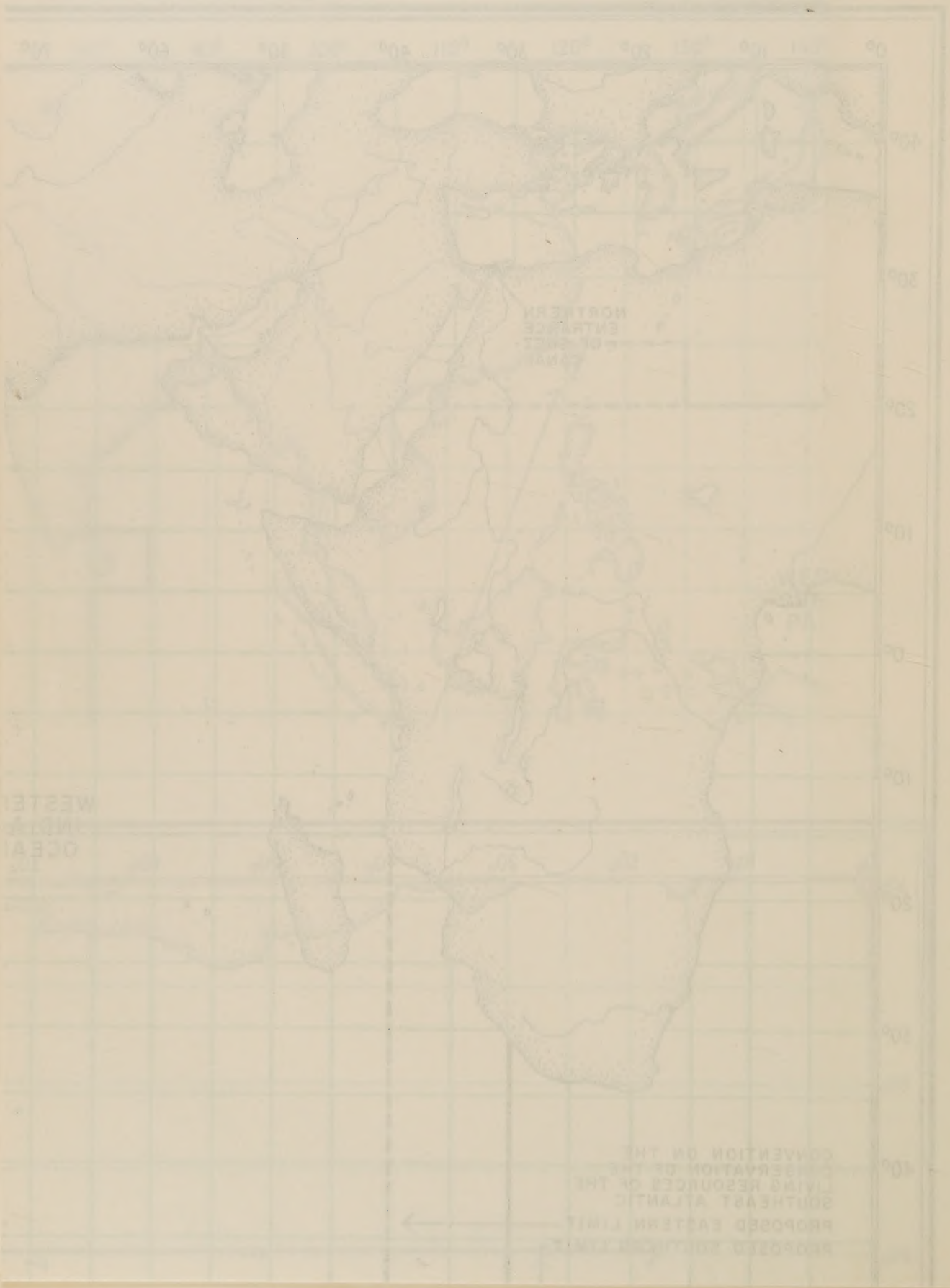
   9.1 Shellfish collecting gears (Dredges and diving excluded)
   9.2 Seaweed collecting gears

10. Others

[2/] See paragraph 5.2

Proposals for the boundaries of the Western Indian Ocean, Eastern Indian Ocean and West Central Pacific Statistical Areas





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